brought to a state of paradise appropriate to Christ's return. To some this will sound quaint. But the fact remains that a science-based utopia, with its supreme confidence in the techno-logical fix, had at least some roots in a newly conceived religious imperative: to hasten the millennium.

It is therefore possible to argue, as Ruse does, that the struggle between evolution and creation is a contest between rival versions of millenarian theology. The world-view and conservative moral values of the creationists tend to be informed by a theology in which God alone can instigate a more perfect society through human redemption. The world-view of the popularizers of evolutionary biology tends to be informed by the legacy of an alternative reading in which humans had to take responsibility for shaping the future. Not for nothing did Julian Huxley describe his evolutionary humanism as a "religion without revelation".

Ruse knows that not all of Darwin's disciples can be shoehorned into his scheme. Indeed, he takes trouble to discuss exceptions. The late Stephen J. Gould is an obvious one, given his aversion to progressive readings of the fossil record and his equally adamant line in *Rocks of Ages* (Ballantine, 1999) that the respective magisteria of science and religion must not be allowed to overlap. For Ruse, Gould is the exception that proves the rule — not least because, on closer analysis, his reduction of religious provenance to questions of morality places him squarely in the secularizing tradi-tion. And one might add that a close analysis of Gould's controversy with Simon Conway Morris shows that his well-known take on the fossils of the Burgess shale was, by his own admission, informed by his own social values.

This book is aimed at a general audience. Ruse's style is chatty and informal, sometimes incongruously so. His historical treatment of Christianity will be too sketchy for fastidious scholars. But let us not underestimate the importance of his message. His appeal is to all who love science; his exhortation is that we "must do more than simply restate our positions or criticize the opposition". A pre-requisite of progress in this cultural struggle is that we should recognize the metaphysical assumptions underlying dogmatic forms of scientific naturalism, and be willing to investi-gate the concerns that motivate criticism.

Ruse has done his best to reveal both. He declines to be a prophet of doom, but precisely because creationism is linked in America with perceived moral and political threats imping-ing on society, he cannot see it vanishing any time soon. Insofar as he has a remedy, it is that Christian and secular evolutionists should not waste time sniping at each other but col-laborate instead. In this regard he would be pleased to learn that Richard Harries, the bishop of Oxford, has joined the evolutionist Richard Dawkins in alerting the British public to defects in creationist rhetoric (unlike an

unhappy predecessor, Samuel Wilberforce, who in 1860 tried to outwit Huxley). In a joint article published in *The Times* on 10 June 2005, the two Richards gave complementary reasons

why the promotion of creationism in schools should be resisted. ∎

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The rise of the computer

Electronic Brains: Stories from the Dawn of the Computer Age
by Mike Hally
Granta: 2005. 224 pp. £15.99
Published in the United States as *In a Fraction of a Second* by Joseph Henry Press ($27.95)

Anthony Ralston

Writing a history of events that took place 50 years ago has the advantages that almost all the documentation is available, and that some of the protagonists are alive to be interviewed. Mike Hally has done this for his book about the development of computers in the years just after the Second World War. But the danger of relying too heavily on such interviews is that important topics can be missed if there are no surviving protagonists.

Electronic Brains grew out of four 15-minute programmes that Hally wrote and produced for BBC radio in 2001. As he accumulated far too much material for one hour of broadcasting, this volume contains much more information than the radio series.

When writing about computers, the question arises as to what you mean by 'computer'. Most people today would agree that this word implies a machine that is general purpose (it can be programmed to solve essen-tially any solvable prob-lem), electronic, has a stored program that is held and executed in the machine, and digital, being based on discrete rather than contin-uous technology. Even so, it is perfectly reasonable to discuss, as Hally does, the pre-history of modern com-puters, when they were often special-purpose, sometimes mechanical, and seldom stored-program. It is nevertheless surprising to find a chapter devoted to MONIAC (Monetary National Income Automatic Computer), an analogue, special-purpose, hydraulic, externally programmed device built in England for eco-nomic modelling. But the chapter is fascinating, and I hurried over to the Science Museum in London to view its MONIAC exhibit.

The chapters on some very early computers, UNIVAC (Universal Automatic Computer, Eckert-Mauchly Computer Corporation, USA, 1951), EDSAC (Electronic Delay Storage Auto-matic Calculator, University of Cambridge,

1949), and LEO (Lyons Electronic Office, an adaptation of EDSAC for business applications, 1951), are competent expositions about three of the first computers to satisfy the definition in the previous paragraph. This material will be familiar to most computer scientists but not to laypeople, who will find much of interest about the development of these computers and the people who developed them.

The chapter on the RAND 409, a computer built by Remington Rand of Rowayton, Con-necticut, is another matter. I admit to prior ignorance of this computer, but the startling thing about this fascinating chapter is that neither here nor in the later chapter on IBM is there any mention of the IBM Card Pro-grammed Calculator (CPC). The CPC was contemporary with, and similar to, the 409, sold better, and was much more influential in the later development of computers. The CPC rates a full page in the 1996 book *Computer: A History of the Information Machine* by Martin Campbell-Kelly and William Aspray (Basic Books), whereas the 409 is not mentioned at all.

Hally's book also contains chapters on the

Big deal: UNIVAC was among the first stored-program computers.

pre-history of computers in the 1930s and 1940s, as well as on early computers in the Soviet Union and Australia.

The final chapter, on the rise and dominance of IBM, is most noteworthy for the remarkable claim that IBM "doesn't figure much" in the early history of computers, "at least until the mid-1960s". Actually, as Hally later makes clear, by the early 1950s IBM was already abreast of its only real competitor, Rem-ington Rand, which bought the Eckert-Mauchly firm in 1950. By the late 1950s, IBM was already in a class by itself.

Hally is quite accurate about hardware but, perhaps because he is an engineer, less so about software. One blooper: the American journal *Mathematical Tables and Other Aids to Compu-tation*, published by the National Research Council in the 1940s and 1950s, is referred to as a "Russian journal". Still, this book contains enough fascinating material to be of interest to both computer experts and non-experts. ∎

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